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Remittances in Asia: Implications for the Fight against Poverty and the Pursuit of Economic Growth

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Asian Development Bank

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Abstract

This study examines the potential of remittances for promoting economic growth and reducing poverty in Asian countries using data for more than 20 countries in the region for 1988–2007. The results indicate that remittances positively affect home country real gross domestic product (GDP) per capita growth. A 10% increase in remittances as a share of GDP leads to a 0.9–1.2% increase in GDP growth. The findings also show that remittances only have a negligible effect on the overall poverty rate, but they tend to decrease the poverty gap and thereby ameliorate the depth of poverty. The estimates suggest that a 10% increase in remittances decreases the poverty gap by about 0.7–1.4%. The paper also explores the robustness of the key results by using 5-year average data and addresses potential endogeneity issues through instrumental variable estimation.

I. Introduction

It is not hard to fathom why individuals migrate from poor regions of the world to more wealthy ones; they just crave a better life for them and for their families. The neoclassical theory of migration (e.g. Todaro 1969) summarizes this behavior by suggesting that migrant workers move to other countries in response to a series of "push" factors related to the domestic economy and "pull" factors from the destination countries. The push factors include poor governance and weak investment climate that may be reflected in limited job opportunities especially for well-paying jobs. The pull factors are a combination of several aspects reflected in a better job opportunity, education system, health care, and living standards. Also, many individual circumstances can impact the overall cost of migrating such as the need to sell (buy) property in the home (host) country and the psychological cost of migrating. This is in addition to constraints such as language, skills, and other barriers that may prevent workers to move. Finally, as the new economics of labor migration postulate (e.g. Stark and Bloom 1985) it is important to recognize that migration maybe one of the household strategies to deal with the limitations of the home country economy (e.g. lack of credit or insurance markets).

International migration dynamics have attracted the attention of academics and policy makers because of its possible impacts in the home country macroeconomic conditions. The current debate suggests that several features of the migration process should be explored to evaluate its full impact in migrant-sending countries. For instance, the migration of the most skilled and educated workers may end up leaving the home country without the skill labor that is essential to achieve sustained economic growth. The debate about whether migration actually results in a brain drain and whether this affects the long-term development prospects of the migrant-sending region or country has been deliberated extensively in both the academic and policy circles (e.g. Beine et al. 2001; Chau and Stark 1999; Docquier and Schiff 2009).

An additional characteristic of the migration process that has attracted the attention of policy makers is the development potential of worker's remittances, the money that migrants send back to their country of origin. The academic and policy deliberations on the topic suggest that the monetary sums that immigrants remit to their relatives and friends can be a significant source of financial capital in developing countries (Fajnzylber and Lopéz 2008). Moreover, recorded remittances are in general less volatile than other nontrade foreign currency inflows, and often strengthen macroeconomic stability.

An examination on the empirical data during 1990–2008 shows the coefficient of variation of remittance flows to developing countries was 0.77 against 0.80 for foreign direct investment (FDI) and 1.34 for private debt, and 1.17 for portfolio equity flows. Official development assistance flows have, in fact, the lowest coefficient (0.33), but are not fully comparable because they include donor expenditure planned sometimes years in advance.[1] One of the key advantages of migrants' transfers over other foreign currency funds flowing to developing countries, such as foreign aid, is that government intervention is not required, given that these flows are sent directly to family and friends. This attribute makes remittances less prone to bureaucratic hitches, including corruption.

While there is vast literature on the impacts that remittances have on specific aspects of the home country socioeconomic conditions, empirical studies on the impact of remittances on aggregate annual gross domestic product (GDP) growth have been few for various reasons. For starters, the policy focus on this topic is relatively recent. Also, and perhaps more important, data on remittance flows to developing countries are lacking. It was not until recently (a little over a decade ago) that government officials and policy institutions realized the towering importance of accurately collecting this information. Recording the volume of migrants' flows was just not a policy priority for many developing countries.

Evidence of the link between remittances and growth using large samples of countries and long-term measures of GDP growth is mixed. Barajas et al. (2009), for example, examine a dataset for more than 80 countries across the world, and find no growth effects. However, Giuliano and Ruiz-Arranz (2009), analyzing data for about 100 developing countries, note that remittances promote growth in less financially developed countries and thus present another way of financing investment. Similarly, Bettin and Zazzaro (2009), using a new indicator of financial development measuring the efficiency of the domestic banking system, note that the impact of remittances on economic growth is negative (positive) in countries where bank efficiency is low (high). Catrinescu et al. (2009) use a large dynamic panel dataset to show that remittances exercise a weak positive effect on long-term macroeconomic growth, and the impact increases in the presence of sound economic policies and institutions.

This study contributes to the literature on remittances by providing an analysis of the impact of remittances on GDP growth in developing Asian countries. We also explore the possibility of remittances being an effective tool for the fight against poverty. Even if remittances are not conducive to GDP growth, these flows may be able to raise household incomes above poverty levels, allowing for more investments in human capital and possibly easing credit constraints. This is extremely important for Asia that, as a consequence of having a large share of the planet's population, holds about two thirds of the world's poorest people.

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[1] It is also argued that foreign aid is not just a tool for promoting development but it has other objectives as well, such as being a sign of diplomatic approval or a reward to foreign governments for behavior desired by the donor. See Burnside and Dollar (2000) for more on issues related to foreign aid flows.

The rest of the paper is structured as follows. Section II discusses the importance of international migration and remittances for Asia, followed by Section III with a discussion of the previous literature on the topic. Section IV introduces the data and empirical methodology, while Section V presents the empirical results. The last section provides key findings and their policy implications.

II. Migration and Remittances in Asia

Asia has a long history of migration. For some countries, such as the United States (US), Asian migration can be traced all the way back to the Gold Rush era (1880s). Nowadays, the US remains one of the top destinations for migrants from Asia as the share of Asian migrants going to this country is about 14%. In fact, migrants for the People's Republic of China (PRC) and the Philippines are the second and third largest immigrant groups in the US, just behind migrants from Mexico (US Census Bureau 2003). The US is followed in the share of migrants by Saudi Arabia (6.5%), the Eurozone (4.4%) and the United Arab Emirates (4%). Recent trends reveal that Asian migrants are no longer restricted in their orientation toward industrial economies, for intra-Asian migration has become more pronounced (ADO, 2008). For instance, in Hong Kong, China, about 70% of the temporary immigrants are originally from other Southeast Asian countries with noteworthy representations of immigrants from the Philippines, Indonesia and Thailand (Orozco and Fedewa 2005).

However striking these statistics are, it does not compare with the volume of remittances sent home by these expatriates. Remittances to Asia comprise the highest regional total in the globe (International Fund for Agricultural Development 2009) and for some of the relatively smaller countries (e.g. Indonesia, Nepal, and Tajikistan) remittances constitute a non-trivial portion of their national income. Half of the top 10 remittance-receiving countries in the world in absolute terms (namely, India, PRC, Philippines, Bangladesh, and Viet Nam) are in Asia. In aggregate, these countries have about 100 million of their nationals living abroad. In 2008, East Asia and the Pacific continued to remain the largest recipients of international remittances among all developing regions, with South Asia as the second largest recipient.

The stability of remittance flows, which contribute significantly to private flows, can counter the effects of falling FDI, debt, and equity flows during an economic downturn in the recipient country. Portfolio investment—as in the case of passive holdings of securities—without any active management, represents a low level of compromise on the part of the investor. As such, it is relatively painless to run away at the first sign of trouble. On the other hand, FDI typically requires a physical investment in the country and as such, these flows are expected to be somewhat sturdier. Nonetheless, the evidence suggests that investors are willing to sacrifice some of the initial investment on

infrastructure to move operations and take advantage of profitable opportunities in other countries. As such, FDI is also a fairly volatile flow, even if it is not as volatile as portfolio investment.

Remittances to Asia have been particularly responsive to major crises in migrants' home countries. For example, Sri Lanka reported a substantial increase in migrant transfers following the 2004 tsunami (Savage and Harvey 2007). This jump occurred despite poorly functioning financial channels at the time (as many important money transfer agencies and banks were closed for a long period in some areas). Remittances played a similarly supportive role after the 2005 earthquake in northern Pakistan (Suleri and Savage 2006) and remittances to the Philippines have been found to respond positively to rainfall-related shocks (Choi and Yang 2007). As also shown in Figure 1, the relative stability of remittance flows compared with other flows in the Philippines stands out, even when the global turmoil began in earnest. Another explanation could be that many Asian migrants have been able to secure jobs that are somewhat resistant to cyclical fluctuations in output (e.g. nurses from the Philippines) and hence have not been affected that seriously by the crisis.

Figure 1: Recent Trends in Private Flows to the Philippines
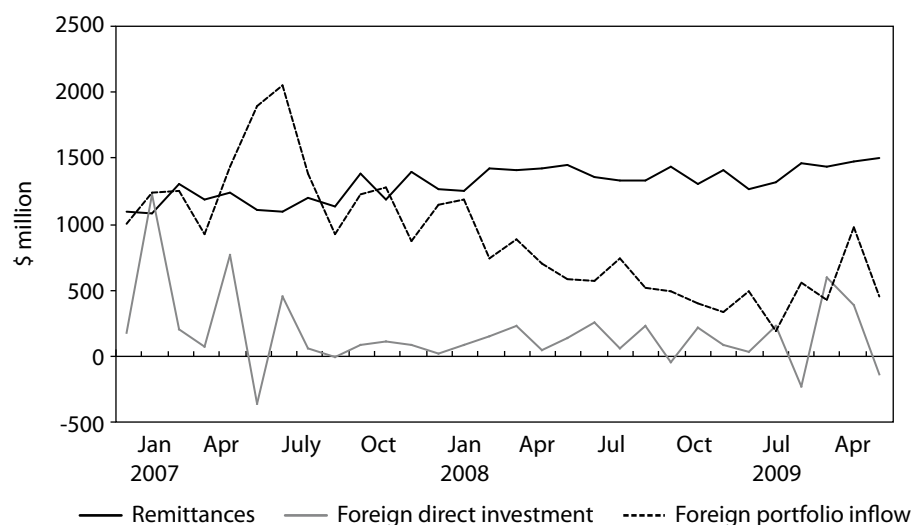
Note: The direct investment series represents the non-residents' investments in the Philippines from the balance of payments.
Source: CEIC Data Company Ltd., downloaded 10 September 2009.

Since the onset of the crisis, the growth of remittances to Asia has decelerated (Figure 2). It seems that the region will be significantly affected by the downturn. In particular, South Asia experienced sharp deceleration in the growth of remittance inflows in 2008. Countries in Central, South, and Southeast Asia, where remittances contribute substantially to economic activity, are particularly exposed to the contagion. For Bangladesh, Pakistan, and Philippines, the statistics for 2009 suggest that

remittances are actually on the rise, which could be due to repatriation of life-long savings. For example, Brown (1997) examining remittance behavior of Tongan and western Samoan migrants in Sydney, Australia found that migrants who plan to return home have a higher propensity to remit and send money for asset accumulation and investment. The International Monetary Fund (IMF) also noted a sharp increase in remittances to Indonesia after the 1997 Asian slump (IMF 2005).

Figure 2: Growth Rate of International Remittances to Asian Regions
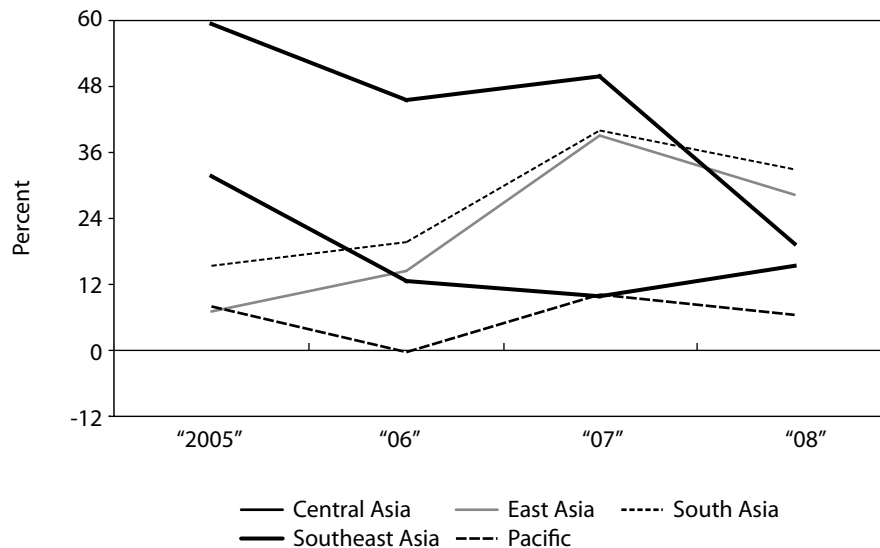
Note: Pacific excludes Cook Islands, Nauru, and Tuvalu.
Source: World Bank, Migration and Remittance data, July 2009, available: www.worldbank.org, downloaded 31 August 2009.

These facts illustrate the significant role of migration and remittances in the Asian economy and indicate that it is crucial to have a detailed look at the potential of remittances in promoting growth and reducing poverty.

III. Previous Literature

A.   Determinants of Remittances

The significant volume of remittances received by developing countries during the previous two decades generated substantial interest. A large fraction of the literature has focused on the determinants of these flows (e.g., Agarwal and Horowitz 2002; Blue 2004; Brown 1997; de la Briere, *et al.* 2002; Funkhouser 1995; Hoddinott 1994; Lucas and Stark 1985; Merkle and Zimmerman 1992; Naufal 2007; Osili 2004; and Vargas-Silva 2009a),

just to name a few. The findings of these studies suggest that a wide range of variables affect the likelihood to remit and the amount remitted. There are also many reasons why migrants send home part of their incomes, such as altruism, self-interest, loan repayment, and insurance motives.

Several of these studies have used survey data from Asian countries, such as Brown (1997), who used survey data from Tonga and Western Samoa to show that while altruism is present as a motivation for migrants' remittances, there is also evidence of self-interest motives.[2] Osaki (1999) investigates the role of gender on migrants' transfers in Thailand and finds differences in the coefficients for males and females for a number of conditioning variables.[3] Yang (2008) uses information on migrants' remittances during the 1997 Asian financial crisis to study the impact of exchange rate shocks on remittances. His results suggest that appreciation of a migrant's currency against the Philippine peso leads to increases in household remittances received from overseas.[4]

B.   Economic Impacts of Remittances

While these and other prior studies provide an appealing discussion on the motives that a migrant has for remitting money home, the current study is more preoccupied with the actual impact of remittances in the receiving economies. Remittances have the potential to impact a great number of variables in the recipient country. Consequently, the studies that have assessed the macroeconomic impact of remittances are varied in their scope and policy conclusions. Generally speaking, remittances may have both favorable and unfavorable consequences.

For example, as a source of household income in poor regions, monetary inflows sent home by migrants have a favorable impact on rebalancing growth by expanding domestic demand. Such receipts also help smooth consumption and promote human capital development by increasing the capacity of households to spend on education, health, and nutrition. Remittances foster economic growth by spurring entrepreneurial activity, improving labor productivity, and stimulating consumption and investment demands. If they raise incomes of the poor, such flows could reduce poverty and income inequality. They may also contribute to macro stability of recipient economies by providing them with foreign exchange and improving their creditworthiness. Moreover, by easing credit constraints and funding physical infrastructures, remittances have the potential to stimulate financial and economic development.

At the same time remittances may have adverse consequences with both economic and social dimensions. They may stifle growth by causing exchange rate to appreciate, thereby dampening trade competitiveness; raising the level of inflation; providing

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[2] See also Ahlburg and Brown (1999), Brown (1994) and Connell (2000) for more on remittances in the South Pacific.

[3] VanWey (2004), in another study using data from Thailand, found that women and migrants from poorer households behave more altruistically, while men and migrants from richer households behave more contractually.

[4] See also Choi and Yang (2007) for more on the determinants of remittances in the Philippines.

disincentives to work among recipients; and creating social problems such as marital conflicts and family stress. Moreover, if remittances benefit more the higher income groups, they can increase income inequality.

Literature shows that remittances may, for instance, negatively impact the labor supply of the receiving households. An increase in remittances is an increase in non-labor or transfer income. As leisure is a normal good, the household would be expected to demand more leisure after receiving transfers. Amuedo-Dorantes and Pozo (2006a) find evidence that remittances tend to encourage Mexican men to change their allocation of labor supply across types of employment, but do not decrease their labor supply. Conversely, they find a drop in the overall labor supply of Mexican women. Acosta (2006), using information from El Salvador, also finds that remittances are negatively related to female labor supply, while male labor force participation does not seems to be sensitive to these flows. But, the results in Rodriguez and Tiongson (2001) indicate that remittances reduce employment among men and women in the Philippines. In sum, the evidence strongly suggests that remittances have a negative impact in the labor supply of receiving households with a particularly important effect in the labor supply of female members.[5]

Another key argument that remittances may harm receiving economies is that remittances can generate inflationary pressures or cause a "Dutch Disease"-like phenomenon. After receiving remittances in a foreign currency, the household will exchange these remittances for domestic currency. This can appreciate the local currency and crowd-out exports. Amuedo-Dorantes and Pozo (2004) provide evidence that remittances cause appreciation of the real exchange rate for 13 Latin American economies. Acosta et al. (2009) provide similar evidence for 109 developing and transition countries. Vargas-Silva (2009b) provides further evidence of real exchange rate appreciation for the case of Mexico. Finally, Javaid (2009) provides recent evidence of remittances causing "Dutch Disease" for a group of South-East Asian countries (Bangladesh, India, Indonesia, Malaysia, Pakistan and Philippines).[6]

On the other hand, a number of studies have highlighted a series of positive aspects of remittances. One of the main claims from those attesting that remittances have a favorable impact on economic development is that remittances are frequently used for investment in the home country. For instance, there is evidence that remittances are regularly invested in small businesses by receiving households (Amuedo-Dorantes and Pozo 2006b). Therefore, remittances can provide households with the initial capital necessary to start a small enterprise. This is especially relevant for developing countries where credit markets are not well developed. Likewise, even if remittances are simply

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[5] In the case of Rodriguez and Tiongson (2001) the negative labor supply response to remittances was more important for men than for women.

[6] While there is plenty of evidence about the impact of remittances on the exchange rate, the result is not universal. For instance, Amuedo-Dorantes et al. (2007), focusing in the case of small-island developing states, present evidence that suggest that while foreign aid tends to appreciate the real exchange rate, remittances do not have the same impact.

spent on household consumption, it could be claimed that the extra demand for products in the home country could benefit the receiving economy by generating a multiplier effect. Lastly, a number of papers study the impact of remittances on schooling in the home country and find that remittances actually promote the schooling of children, thus increasing domestic human capital levels (Edwards and Ureta 2003).

C.   Impacts of Remittances on Economic Growth

With regard to remittances and aggregate income, there are two strands of the literature: focusing on the impact of remittances on short-term fluctuations and concentrating on the impact of remittances on long-term economic growth. A good perception of the business cycle and its relationship with remittances can be quite useful for Asian countries in order to react adequately to cyclical fluctuations in output. If remittances are countercyclical with respect to the home economy, receiving countries could potentially use remittances as part of their strategy to offset negative cyclical fluctuations in output. In this regard, Sayan (2006) finds that remittances in Bangladesh are countercyclical and are synchronous with the business cycle, whereas in India, remittances are also countercyclical but with a 1-year lag.

The potential reasons for the response of remittances to cyclical fluctuations may be embedded on the motives for remitting. If the migrant cares about household well-being, and if the negative cyclical fluctuations are affecting an important share of the households in the home country, then remitters may respond with an increase in transfers. On the other hand, if remitters are mostly interested in investing in the home country, then remittances may decrease following negative cyclical fluctuations in output. While these are suitable explanations for the cyclical behavior of remittances, it is important to note that just by simply looking at the business cycle behavior of remittances, we do not posses sufficient information to elucidate on the main motives for remitting on the part of migrants.

A series of studies have focused directly on the relationship between remittances and economic growth. Giuliano and Ruiz-Arranz (2009) explore the relationship between remittances and the financial sector of the receiving country. They posit that in those countries that lack proper credit markets, remittances may ease credit constraints by allowing entrepreneurs to obtain the necessary capital for business ventures. Using data for about 100 developing countries, they find evidence that remittances promote growth in less financially developed countries. Mundaca (2009) presents a theoretical model in which remittances have a long-term impact on the receiving economy only if these flows are invested in long-run technology or used for capital investment. However, she argues that investment in those areas would only be possible in the presence of financial intermediaries that facilitate the lending of saved remittances money.

Catrinescu et al. (2009) argue that previous remittances and growth studies (e.g. Chami et al. 2003) suffer from endogeneity issues and have also failed to address the issue of how economic and governance policies that support the business environment in the receiving country assist the impact of remittances. Using dynamic panel estimation, they find that remittances exercise a weak positive effect on long-term macroeconomic growth. Ruiz et al. (2009) reexamined the relationship between remittances and economic growth, with special attention on the importance of the nonlinearity of this relationship. They show that the relationship between remittances and growth is neither linear nor quadratic, proposing the use of a semiparametric model to avoid misspecification bias from imposing an arbitrary functional form. Their results suggest that there is evidence of a positive association between remittances and growth in parametric estimations; however, the evidence of such relationship vanishes when nonlinearity is taken into account by means of nonparametric techniques.

D.   Impacts of Remittances on Poverty

While economic growth and poverty reduction usually go hand in hand, it is possible for a country to experience significant growth without a decrease in poverty (Rodrik 2000). Adams and Page (2005) are among the first to bring this subject to the spotlight and explore whether remittances can be used as an effective tool for reducing poverty. They construct different indicators of poverty: a poverty headcount index (measuring the level of poverty), a poverty gap index (measuring the depth of poverty), and a squared poverty gap index (measuring the severity of poverty). Using data from 71 developing countries, they find that remittances do in fact, reduce the level, depth, and severity of poverty. The instruments used include distance, education, and government stability.

Jongwanich (2007) revisits the issue of remittances and poverty by giving special emphasis on possible endogeneity issues. The author employs panel GMM regressions in growth and investment equations to control for endogeneity and uses an instrumental fixed-effects transformation in human capital and poverty equations. Using data for developing Asia and Pacific countries for 1993–2003, Jongwanich finds that remittances have a significant impact on poverty reduction by raising income. On the other hand, results suggest that remittances have only a marginal impact on growth.

Brown (2008) looks at the issue of remittances and poverty using survey data from Armenia, Azerbaijan, Kyrgyz Republic, and Tajikistan. He conducts a series of counterfactual experiments recognizing that remittances are preceded in most cases by migration of one or more household members. As such, to receive remittances, most likely the household had to sacrifice the income that the migrant would have been otherwise contributing to the household. In the first counterfactual experiment, Brown assumes that in a world without migration (and hence, without remittances) the household's income would be the same as the observed non-remittance income. That is, this scenario assumes that without migration, the migrant does not contribute to

household income. Given that this is an unrealistic scenario for most households, the author also assumes a second scenario in which in a world without migration household income depends on the characteristics of the migrant members. Results suggest that remittances are important in reducing poverty in the Kyrgyz Republic and Tajikistan, but not so much in Armenia and Azerbaijan.

IV. Methodology, Data, and Empirical Approach

A.   Methodology

One common characteristic of many of the papers on remittances and growth discussed above is that they were published in 2009. While there are several previous studies on the topic (before 2009), the fact that so much work is been currently done focusing on this specific topic implies that there is a *current* interest about this issue. This paper adds to the discussion of this now much in-vogue topic.

With regard to the empirical methodology, this paper deviates from the previous studies in two aspects. First, it focuses exclusively on the case of Asia, the region that receives that largest share of remittances in the globe. Second, it presents the results using annual data instead of the more traditional 5-year averages. The reason is that the regional sample has a severely limited number of observations. Nonetheless, for completeness, Appendix A of the paper replicates the results using 5-year averages of data. Furthermore, as mentioned above, in addition to discussing the impact of remittances on growth, this paper also inquires on the impact of remittances on poverty reduction. The key idea is that remittances could reduce poverty by increasing the income of the recipients, without necessarily conducing to GDP growth. If that is in fact the case, then one should think of remittances as an effective tool for the fight against poverty, instead of an instrument for achieving economic growth.

To explore the impact of remittances on growth and poverty in Asian economies, this paper conducts two separate sets of estimations. It starts by exploring the impact of remittances on growth and then the effect of remittances on poverty. The two equations of interest are:

$$g_{it} = f\left(R_{it}, Y_{i1}, I_{it}, O_{it}, \pi_{it}, H_{it}\right)$$

(1)

and

$$P_{it} = f\left(R_{it}, Y_{it}, I_{it}, O_{it}, \pi_{it}\right)$$

(2)

In Equation 1 (the growth equation), g_{it} is economic growth (the logarithm of the growth rate of GDP per capita) and Y_{i1} is the natural logarithm of initial GDP per capita. If there is catching up between the countries, it is expected that initial GDP per capita will have a negative effect on growth, given that countries that were initially poorer should grow at a faster rate. Conversely, if the gap between the countries is widening, then initial GDP per capita should have a positive impact on growth. The human capital measure (H_{it}) is the primary school completion rate (percent of relevant group). I_{it} represents investment that is measured as the natural logarithm of gross capital formation (percent of GDP). It is expected for growth to go hand in hand with human capital and investment, given the well-known benefits of human and physical capital for growth performances (Barro and Sala-i-Martin, 2003). The annual percent change in the GDP deflator is used as the inflation rate (π_{it}). Andrés and Hernando (1997), among others, show that inflation has a significant cost in terms of GDP growth. Meanwhile, O_{it} represents openness and it is estimated as the natural logarithm of export plus imports as a percentage of GDP. As stated by Edwards (2001), whether openness favors economic growth or not is one of the oldest controversies in the economics profession. Nonetheless, at present, the balance of evidence suggests that free trade results in more rapid economic growth and that protectionism hurts economic performances. Recent evidence also suggests that openness can have an indirect effect in reducing poverty in Asian countries (Pernia and Quising 2002). Finally, R_{it} represents the natural logarithm of remittances as a percent of GDP.

In Equation 2 (the poverty equation) P_{it} refers to the log of the poverty measure used, while Y_{it} refers to the natural logarithm of GDP per capita. While GDP per capita is widely regarded as a useful indicator of well being in a country, a high GDP per capita is not necessarily tied to lower poverty levels.

B.   Data

The first step in an empirical paper with aggregate remittances data is to determine which series of remittances to employ in the estimation. There is a battery of reasons for having concerns about the quality of remittances aggregate data, which range from inconsistencies in reporting formats by central banks in different countries to, as we discussed further below, difficulties in measuring informal flows. In some instances, central banks' reporting requirements do not allow remittances and compensation of employees to be separately reported, and therefore, central banks report remittances and compensation of employees together in one category. In other cases, remittances and compensation of employees are reported individually.[7]

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[7]   The compensation of employees is the total remuneration, in cash or in kind, payable by an enterprise to nonresident employees of a country in return for work done by the nonresident employee during the accounting period.

In this regard, the *World Bank Migration and Remittances Factbook* (World Bank 2008, xii) argues that:

> "Workers' remittances, as defined in the IMF Balance of Payments manual, are current private transfers from migrant workers who are considered residents of the host country to recipients in their country of origin. If the migrants live in the host country for a year or longer, they are considered residents, regardless of their immigration status. If the migrants have lived in the host country for less than a year, their entire income in the host country should be classified as compensation of employees. Although the residence guideline in the manual is clear, this rule is often not followed for various reasons. Many countries compile data based on the citizenship of the migrant worker rather than on their residency status. Further, data are shown entirely as either compensation of employees or as worker remittances, although they should be split between the two categories if the guidelines were correctly followed. The distinction between these two categories appears to be entirely arbitrary."

Acknowledging these differences in the reporting of remittance data, we employ a broad measure of remittances recommended by the *World Bank Migration and Remittances Factbook*. This measure defines remittances as the sum of workers' remittances, compensation of employees, and migrants' transfers. The World Bank (2008) argues further that to get a complete picture of remittances, one has to look at these three items together.

Except for the measure of remittances that comes from the *World Bank Migration and Remittances Factbook* (2008) all other series are taken from the *World Development Indicators*. The data is in annual frequency and covers the period from 1988 to 2007. Please refer to Appendix B for more details about data construction and definitions.

C.   Empirical Approach

This paper started with the intention of including all developing member countries of the Asian Development Bank in the estimation.[8] However, given the data problems for several countries, the estimations include only from 15 to 27 of the 44 Asian Development Bank members. Also, while it is possible to think about other control variables to include as determinants of growth (or poverty), we are faced with significant data constraints.[9]

The analysis is conducted using different econometric approaches. First, we start by conducting a growth equation using annual data and an OLS estimation. At this point, we would like to think that our set of independent variables explains all of what is different

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[8]   See the members at: www.adb.org/Countries/.
[9]   We especially recognize the importance of not including a budget surplus variable.

about a country, but that regrettably is unlikely. Therefore, we need to take care of unobserved heterogeneity. Controlling for heterogeneity is important given that we are using data from countries that differ significantly in aspects such as size; location within Asia; and institutional, cultural, historical, and political background. To control for possible unobserved heterogeneity, we use fixed-effects and random-effects estimations.

V. Results

A.   Remittances and Economic Growth

Table 1 summarizes the results of the estimation of the growth equation. Columns (1), (2), and (3) show the results obtained when we employ annual data using OLS, fixed-effects and random-effects estimations, respectively. Looking first at the control variables, we can observe that investment and inflation stand out as the only control variables that are significantly different from zero in all three cases. As expected, investment and openness come out to be positively related to growth. Surprisingly, the first column suggests that inflation is also favorable for growth performance. However, once we control for heterogeneity in the fixed and random-effects estimations, the significance of the inflation coefficient disappears.

Table 1: Estimation Results: Annual GDP Growth

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Remittances	0.05	0.12	0.09	0.05	0.15	0.10
	(1.58)	(2.14)**	(2.3)**	(1.57)	(2.7)***	(2.53)***
(Remittances)^2	–	–	–	0.00	−0.05	−0.03
				(−0.33)	(−2.13)**	(−1.44)
Initial GDP	0.00	–	−0.02	0.00	–	−0.02
	(0.05)		(−0.2)	(0.03)		(−0.16)
Investment	1.02	1.17	1.16	1.02	1.23	1.18
	(5.93)***	(5.82)***	(6.4)***	(5.91)***	(6.12)***	(6.51)***
Openness	0.19	0.59	0.32	0.19	0.48	0.31
	(1.96)**	(2.78)***	(2.22)**	(1.96)**	(2.25)**	(2.12)**
Inflation	0.01	0.00	0.00	0.01	0.00	0.00
	(2.33)**	(0.54)	(1.04)	(2.34)**	(0.43)	(0.97)
Human	0.00	0.00	0.00	0.00	0.00	0.00
Capital	(−0.69)	(−0.57)	(−0.42)	(−0.66)	(−0.14)	(−0.19)
Obs.	199	199	199	199	199	199
Countries	–	26	26	–	26	26
F / Wald Test	7.21	9.73	48.35	6.17	9.04	50.96

GDP = gross domestic product.
Notes: The dependent variable is logarithm economic growth. (1) and (4) OLS estimation with annual data, (2) and (5) fixed-effects estimation with annual data, (3) and (6) random-effects estimation with annual data.
　　　　The numbers in parentheses are the t-statistics. *, **, *** indicate 10 %, 5 % and 1 % level of significance respectively.
Source: Authors' estimates.

The effects of remittance flows are significant in the last two methodological approaches (fixed and random effects in columns [2] and [3]). The evidence regarding remittances using annual data is robust once we control for country-specific factors and it indicates that remittance transfers are positively related to output growth. The manner in which the numbers are reported in the table allows the coefficient on remittances to be interpreted as follows: a 10% increase in remittances as a share of GDP in a given year leads to about a 0.9–1.2% increase in annual growth. For comparison purposes, we repeat the exercise in Table 1 but estimating instead elasticises at the mean. The elasticities at the mean of the growth rate of GDP per capita with respect to remittances as a share of GDP are .032 (fixed effects) and .025 (random effects).

The literature already contains plenty of studies that have associated remittances to business cycle fluctuations of the home and host country (Roache and Gradzka 2007; Sayan 2006; Vargas-Silva 2008), while the impact of remittances on growth has provided mixed results (Catrinescu et al. 2009; Chami et al. 2005; Giuliano and Ruiz-Arranz 2009; Mundaca 2009; Ruiz et al. 2009). The results that we obtained using standard methodologies suggest that remittances can help spur short-term fluctuations in output in Asia.

There are several concerns with regard to remittances growth equations. One such concern lies with the possibility of nonlinearity. Although the previous results tend to suggest that the impact of remittances on economic growth is positive, the relationship between these two variables can be nonlinear. It is probable that if remittances advance growth, their impact has diminishing returns. That is, there is a threshold after which the impact of remittances on growth diminishes or disappears.[10]

Columns (4), (5) and (6) of Table 1 report similar estimations to those discussed previously but also including the square of remittances in the regression to check for diminishing returns. In the three cases (OLS, fixed, and random effects with annual data) we have evidence of remittances having a positive but decreasing effect on output. However, only in the case of fixed effects is the coefficient of the square of remittances significant.

Two additional potential concerns with the previous estimation lie with the difference between annual GDP growth and long-term economic growth and the possibility of endogeneity. It is often the case that growth equations are not simply estimated using annual data, but using 5-year averages of the data to assess the long-term impact. Moreover, there are reasons to suspect an endogenous relationship between remittances and GDP growth and studies typically address this issue by employing an instrumental variable estimation. Given the small number of observations that we have for the 5-year average estimations and the controversies surrounding the selection of an adequate

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[10] This possible nonlinearity has not been completely ignored by the previous literature. Chami et al. (2005), Barajas et al. (2009) and Catrinescu et al. (2006) include a squared term of remittances in some of their specifications, while Ruiz et al. (2009) conduct a semi-parametric estimation to address the nonlinearity issue.

instrument for remittances, we do not address these issues in the main part of the paper. However, recognizing the potential importance of these two issues, we have included estimations addressing these two concerns in Appendix A of the paper.

B.   Remittances and Poverty

In addition to the impact of remittances on annual GDP growth, we are also interested in the possibility of remittances being an effective tool for poverty reduction as specified in equation 2. Migration from developing countries allows poor households in developing countries the opportunity of taking advantage of segmented job markets in which the pay received by one or more household members is higher than it would have been otherwise in the home country. The migrant may send back a share of his or her income that more than compensates for the loss of income at home. As such, remittances may increase incomes of poor household and decrease poverty.

Table 2 reports the results from the poverty equation. There is no unique standard measure of poverty such as the one for economic growth. For this reason we report fixed-effects and random-effects estimations using three alternative measures of poverty: (i) the poverty headcount ratio at the national poverty line (percent of population); (ii) the poverty gap at US$1.25 a day (percent, PPP); and (iii) the poverty headcount ratio at US$1.25 a day (percent of population, PPP). These measures are different and, as we will see below, results differ with regard to the impact of remittances on these variables.

Table 2: Estimation Results: Poverty

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Remittances	−0.08	−0.04	−0.14	−0.07	0.00	−0.02
	(−1.22)	(−0.96)	(−1.67)*	(−2.06)**	(0.05)	(−0.33)
GDP Per Capita	−0.35	−0.48	−0.91	−0.93	−1.03	−1.02
	(−0.93)	(−3.1)***	(−2.6)***	(−3.5)***	(−3.28)***	(−7.78)***
Investment	−0.56	−0.54	0.12	0.48	0.24	0.21
	(−3.52)***	(−4.03)***	(0.81)	(1.66)*	(0.92)	(0.92)
Openness	−0.10	0.02	−0.02	−0.22	−0.17	−0.33
	(−0.38)	(0.1)	(−0.7)	(−1.25)	(−0.59)	(−1.86)*
Inflation	0.00	0.00	0.00	0.00	0.00	0.00
	(0.17)	(0.62)	(.9)	(0.74)	(1.83)*	(1.03)
Obs.	40	40	68	68	68	68
Countries	20	20	20	20	20	20
F/Wald Test	7.74	50.68	8.32	42.62	9.27	108.9

GDP = gross domestic product.
Notes: (1) fixed-effects estimation, dependent variable is the logarithm of poverty headcount ratio at the national poverty line (percent of population); (2) random-effects estimation, dependent variable is the logarithm of poverty headcount ratio at the national poverty line (percent of population); (3) fixed-effects estimation, dependent variable is the logarithm of poverty gap at US$1.25 a day (percent, purchasing power parity [PPP]) ; (4) random-effects estimation, dependent variable is the logarithm of poverty gap at US$1.25 a day (percent, PPP) ; (5) fixed-effects estimation, dependent variable is the logarithm of poverty headcount ratio at US$1.25 a day (percent of population, PPP) ; and (6) random-effects estimation, dependent variable is the logarithm of poverty headcount ratio at US$1.25 a day (percent of population, PPP).
The numbers in parentheses are the t-statistics. *, **, *** indicate 10 %, 5 % and 1 % level of significance respectively.
Source: Authors' estimates.

The first and third measures are headcount indexes and they are useful in estimating the incidence of poverty. These are measures of the share of the population in a certain country whose income is below the poverty line, defined at the national and international levels. The second measure deals with the poverty gap and provides information about the depth of poverty. This variable measures how far below poor households are from the poverty line. It is estimated as the mean shortfall of the total population from the poverty line, expressed as a percentage of the poverty line. Because this measure is not as intuitive as the previous one, let us cite Adams and Page (2005) explanation of this variable: "a poverty gap of 10% means that the average poor person's expenditures (income) are 90% of the poverty line." Moreover, the first measure is relative for each country as it indicates the proportion of the national population whose incomes are below an official threshold set by the national government. On the other hand, the last two measures use the Asian Development Bank standard threshold of US$1.25 as the poverty line.[11]

Columns (1) and (2) show the results when we use the poverty headcount ratio at the national poverty line as the measure of poverty. Fixed effects are shown in column 1 and random effects are shown in column 2. Columns (3) and (4) display the results when we use the poverty gap at US$1.25 a day, fixed effects and random effects, while columns (5) and (6) replace as the dependent variable the poverty headcount ratio at US$1.25 a day. It seems that using the first measure of poverty, we get the result— not unexpectedly—that investment decreases poverty. In the case of the random-effects estimation, it seems that a higher GDP per capita is related to a lower poverty rate. Meanwhile, it seems that remittances have a negative impact on poverty, but the impact is not statistically significant. Nonetheless, for the next measure of poverty, the impact of remittances is still negative and it is significant in both cases. The coefficients suggest that a 10% increase in remittances (as a percentage of GDP) can decrease the poverty gap (basically, the income by which families fall short of the poverty line) in Asian countries by about .7–1.4%. Moreover, as we did with the first growth estimation in Table 1, we also estimated the elasticities of the poverty gap with regard to remittances at the mean values. In this case, the estimation suggests that the elasticities at the mean are .07 for the fixed-effects estimation, and .04 for the random-effects estimation.

Finally, with regard to the last measure we, once again, find mixed results between the fixed-effects estimation and the random-effects measure. In the random (fixed) effects estimations, remittances have a negative (positive) effect on poverty. However, in both cases, the coefficient is not significant. In sum, the estimated relationship between remittances and poverty depends on the selection of the measure of poverty and the methodology used. Nevertheless, results hint that remittances decrease the poverty gap.

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[11] See the discussion at web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/EXTPA/ 0,,contentMDK:20202198~menuPK:435055~pagePK:148956~piPK:216618~theSitePK:430367,00.html.

VI. Summary, Policy Recommendations and Concluding Remarks

The aim of this study is to analyze the impact of remittance transfers in Asian countries. In particular, we conduct this study to shed light on the possibility of remittances fostering annual GDP growth and abating poverty in the region. The previous literature on remittances and growth (or poverty) has found mixed results, with most studies suggesting that remittances have some potential for advancing economic growth agendas and decreasing poverty. A large portion of the literature is recent, which indicates current interest in the topic.

The key findings of this study can be summarized as follows. Fixed-effects and random-effects estimations indicate that remittances affect home country real annual GDP per capita growth positively. The results imply that a 10% increase in remittances as a portion of GDP leads to about a .9–1.2% increase in output growth. This figure is quite significant given that in many countries in Asia (e.g. Philippines, Tajikistan) remittances account for more than 10% of GDP. The results using annual data also indicate that remittances impact on growth is positive but decreasing, hence the impact is likely to be greater in the new immigration countries, than in countries with an established migration culture. Nonetheless, this result is not completely robust.

The impact of remittances on poverty depends on the measure of poverty used and the methodology that is selected. It seems safe to conclude that remittances decrease the poverty gap and ameliorate the depth of poverty. In this regard, the estimation suggests that a 10% increase in remittances (as a percentage of GDP) can decrease the poverty gap (the income by which families fall short of the poverty line) in Asian countries by about 0.7–1.4%. The impact of remittances on the overall poverty rate is not straightforward. Although mostly negative, it is not significant.

There is evidence in our results that remittances may have a positive impact on GDP per capita in the short run. Therefore, receiving countries should not necessarily think about remittances as an instrument for long-term development, but also as a tool to tackle short-run fluctuations in output. This is not to say that remittances are automatic mechanisms that can correct negative cyclical fluctuations in output, but rather that these flows could be part of the policies intended to address those cyclical fluctuations. However, this role of remittances is more practical for local fluctuations in output and in cases in which most of the destination economies remained relatively stable. In a situation like the current financial crisis where the global economy is weak, migrants' pockets are also suffering the downturn and therefore it would be difficult for many migrants to compensate households for the poor economic conditions back home.

In the long run, remittances also seem to have a positive impact on output, but the relationship is not significant (see results in Appendix A). This does not imply that remittances do not have long-term beneficial aspects for the receiving economy, but rather, those aspects are not revealed by the empirical relation between aggregate remittances and growth. Hence, as a long term bet, the positive impact of remittances on economic growth may not pay off. Rather than taking this gamble, Asian countries should also look into other complementary ways of propelling economic growth and development.

Finally, remittances may or may not reduce poverty, depending on the poverty measure used and the methodology selected. Previous evidence suggests that migrants' transfers do not always flow to the poorer households in a country and therefore have been even charged with increasing inequality in receiving communities (Barham and Boucher 1998). Nevertheless, it is undeniable that remittances increase the income of the remittance receiving households and, therefore, should be part of any household income-increasing policies in developing countries. Whether remittances would translate into a massive reduction of poverty in developing countries remains to be seen. Interestingly, our results are robust with regard to the negative effect of remittances on the poverty gap. As such, remittances can be a useful weapon for reducing the depth of poverty. It is important to recall that poverty rates simply indicate the percentage of the population of a country that is poor by some standard, but they do not advise us on whether people are living in hopeless poverty or are just below poverty line. That of course makes a difference and, therefore, the fact that remittances can reduce the depth of poverty is encouraging.

Worldwide remittances transfers have increased dramatically in recent years and Asia has been at the center of this increase. With three of the four main remittances recipients in the world located in the region, the possible impacts of these flows in receiving countries in the area have awakened the curiosity of academics and have captured the attention of key policy makers. Remittances are already being called a new development mantra, manna from heaven, and even a present-day miracle. While the evidence above suggests that the current impact of remittances on economic growth and poverty is not completely robust, that does not imply that there are no policies that Asian countries can adopt to make the most out of the inherent development potential of remittances. For instance, many countries in the region (e.g., India and Pakistan) are already providing beneficial terms (e.g., higher interest rates, tax exemptions, flexible currency conversion) to financial instruments (e.g., bonds) that are acquired by their expatriates. These types of policies promote the investment of migrants' monies into the financial sector of the receiving economies and help enhance the financial literacy of both the migrant and the household. Other possible policies that have been adopted by countries in other regions of the world include matching flows of collective remittances by migrant organizations or hometown associations (groups with members from the same region in the migrant-sending country) with government funds to enhance the development impact of these transfers.[12] This

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[12] For example, Mexico's "three for one" program matches each US dollar contributed by a migrant or hometown association with three additional US dollars of government funds.

policy can be implemented by national, state, or even local governments interested in development projects. In both of these cases, the government can undertake the role of liaison between the migrants and the receiving economy. However, while playing this role, the government must resist the temptation of directly managing, instead of just channeling, remittance flows. Above all, it is imperative to remember that the key aspect of remittances is that these are largely flows from migrants to friends and family back home.

International organizations may help in coordinating efforts so that remittance flows are used to alleviate some of the market inefficiencies of receiving economies. For instance, many international organizations (e.g., The Multilateral Investment Fund of the Inter-American Development Bank) are promoting the provision of loans to households for home purchasing using remittances and the migrant as collateral. This course of action can be especially valuable in developing countries where credit markets are not well developed. There is often a lack of credit services in general, other times (especially in rural areas) households have land but lack ownership titles, have crops but no deeds, and run businesses without statutes of incorporation (De Soto 2000) and as such, it is virtually impossible to obtain credit from the few sources available, given the lack of collateral.

International organizations can also help steer remittances toward loans for small businesses. This task is very relevant for Asian developing countries, because in addition to dealing with credit market shortcomings, migration can be an instrument in dealing with insurance market inefficiencies. It is possible to ponder that the possibility of receiving remittances may allow the household to enter more profitable, but riskier businesses, given that if things go south, remittances can be used as a source of support for the household. By leaving the household and moving to another region or country, the migrant will be subjected to risks that are mostly uncorrelated to those that the household faces. The income risks in Asian developing countries are multiple. Typical sources of risk include crop failure due to a drought, flooding, or frost; reduction in household labor income due to the death or illness of a productive member of the household; crime; and the possibility of government-sponsored real estate property redistribution programs (e.g., land reform). If household income is subjected to any of these jeopardies, the household would be able to diversify income risk by sending a member abroad. Furthermore, most small businesses require an initial period of investment that is not accompanied by any profits from the new venture. Remittances can help support the business during this period. Nonetheless, even with all these potential benefits of remittances in terms of small business formation, many households lack the understanding and expertise necessary to start these enterprises. International organizations can be of great assistance if they provide advice to households in this regard. Spreading this information will facilitate the use of remittances as a tool for development.

Last but not least, it is relevant to recall that migration is a phenomenon that has been present during the entire history of civilization. As such, it is unlikely to disappear during the upcoming decades. This fact has often created concerns in sending countries, given the high cost of migration for sending regions in terms of the brain drain. This, however, is not necessarily a dreadful aspect of migration. First, it is argued that the departure of the most educated individuals from a country may result in the creation of a brain bank that provides local innovators access to priceless knowledge build up abroad (Agrawal et al. 2008). Moreover, as Chau and Stark (1999) demonstrate, it is possible for per capita income in a country to be higher with migration than without migration. Moreover, they show that allowing the migration of skilled workers can increase the welfare of the home population and, hence, a brain drain can lead to a welfare gain. Previous studies also suggest that migrants are in a superior situation to invest in their home countries because they have specific knowledge that other foreign investors lack. Non-migrant locals also have this knowledge, but they often lack the valuable business expertise that is typically acquired abroad. Finally, it is often the case that migration is a two-way occurrence, with many migrants returning back home after a few years abroad. The return of highly skilled expatriates with specialized knowledge (e.g., engineers, scientists) can help improve research and development programs in Asia. In sum, countries should not be too anxious about the brain drain that accompanies migration. Instead of trying to keep locals from moving abroad, countries should embrace migration as part of humankind behavior and promote policies that make the best out of the migration of nationals to other countries.

Appendix A: Robustness

It is often the case that growth equations are not simply estimated using annual data, but using 5-year averages of the data to assess the long-term impact. In this appendix, we also follow this approach by presenting the results obtained using 5-year averages instead of annual data. An obvious result of using 5-year averages is that we lose an important share of the observations. Finally, we also explore the robustness of the results to concerns such as endogeneity by conducting instrumental variable estimations. In that regard, we present estimations using the instrument suggested by Barajas et al. (2009) as well as with other instruments used in previous remittances studies.

Table A1 reports the results when we employ 5-year averages. By taking 5-year averages, we get rid of the short-term cyclical fluctuations in output. Table A1 suggests that it is still the case that investment comes out as a dominant variable. There is also some evidence of economic growth being affected positively by human capital. Finally, initial gross domestic product (GDP) per capita has a negative impact on growth performances, which indicates some catching up between countries in the region. Meanwhile, the coefficient on remittances turns out to be not significant. This seems to be the norm across estimation methodologies. Hence, it seems that remittances impact growth in the short term, but not in the long term. For the case of 5-year averages data, we also fail to find evidence of a diminishing relationship between remittances and growth (or of a linear relationship for that matter).

Table A1: Estimation Results: 5-Year Averages

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Remittances	−0.04	0.08	−0.03	−0.04	0.06	−0.03
	(−0.47)	(0.44)	(−0.42)	(0.47)	(0.33)	(−0.36)
(Remittances)2	−	−	−	0.00	−0.04	0.00
				(0.08)	(−0.63)	(−0.09)
Initial GDP	−0.26	−0.54	−0.27	−0.26	−0.46	−0.27
	(−2.19)**	(−0.83)	(−2.13)**	(−2.16)**	(−0.69)	(−2.08)**
Investment	1.61	1.65	1.59	1.61	1.76	1.59
	(4.1)***	(2.61)***	(3.97)***	(4.06)***	(2.66)***	(3.9)***
Openness	0.07	0.13	0.09	0.07	0.10	0.09
	(0.34)	(0.19)	(0.41)	(0.34)	(0.14)	(0.42)
Inflation	0.00	0.00	0.00	0.00	0.00	0.00
	(0.8)	(−0.49)	(0.55)	(0.8)	(−0.44)	(0.51)
Human Capital	0.01	0.03	0.01	0.01	0.03	0.01
	(1.4)	(1.86)*	(1.41)	(1.36)	(1.9)*	(1.4)
Obs.	76	76	76	76	76	76
Countries	−	27	27	−	27	27
F / Wald Test	4.73	1.96	25.50	4.00	1.71	24.80

GDP = gross domestic product.
Notes: The dependent variable is logarithm economic growth. (1) and (3) OLS estimation with 5-year averages, (2) and (4) fixed-effects estimation with 5-year averages, (3) and (6) random-effects estimation with 5-year averages.
The numbers in parentheses are the t-statistics. *, **, *** indicate 10 %, 5 % and 1 % level of significance respectively.
Source: Authors' estimates.

An additional potential concern with the previous estimation lies with the possibility of endogeneity. There are, in particular, two issues that may lead us to suspect endogeneity. First, remittances typically respond to changes in household income (e.g., altruistic remitters may decrease their

transfers as household income increases) and second, it may often be the case that for many households, income is strongly related to local macroeconomic conditions. As such, remittances, in addition to having an impact on growth, may be also responding to output growth. In this type of scenario, the estimated coefficients are biased and inconsistent. Therefore, we also conduct an instrumental variable estimation. The first set of instruments used is chosen based on the instruments used by Adams and Page (2005) and Amuedo-Dorantes and Pozo (2004).

Adams and Page (2005) used three instruments for remittances: distance between the remittance sending and receiving countries, level of education, and government stability. The first variable cannot be used without strong further assumptions that may not hold for the case of Asian countries. Data on remittance bilateral flows is not readily available. Therefore, Adams and Page (2005) estimate the distance between the home country and the main remittance-sending country. This works if flows were mainly coming from one specific country (e.g., US and Mexico), but as we explained above, flows to Asian countries come from different parts of the world such as US, Europe, and Middle East. Therefore, just choosing one (or a combination) of these regions is not feasible. But even more crucial, it is possible to attest that the distance variable is not as relevant for a regional study such as the current one. For instance, while there is a distance gap between India and the Philippines, in *relative* terms, these are countries that are close to each other. Hence, we feel that this instrument is better fitted for global studies. The second variable used by Adams and Page (2005) is education, which is one of our regressors and given the importance of education for economic growth, we prefer to use this variable as a regular regressor. As a consequence, we are only left with government stability and we include this variable as one of our instruments.

Amuedo-Dorantes and Pozo (2004) used as instruments education, the rate of vaccination coverage of children less than 1 year of age, the crop production index, and the livestock production index. As we mentioned above, we prefer not to use education as an instrument. Furthermore, the rate of vaccination was not available for most countries in our sample. Hence, we are left with the last two variables, the crop production index and the livestock production index, which we also use as instruments.

In sum, to instrument remittances, we used the crop production index and the live stock production index of the remittance-receiving country obtained from the *World Development Indicators* and the government stability index for these countries from the Political Risk Services group. Due to data limitations, we lose an important number of the observations in the instrumental variable estimation. In particular, we are left with only 101 observations for 15 countries for the annual data set and 46 observations for 15 countries for the 5-year averages data set. The results from the instrumental variable estimation are shown in Table A2. The results for columns (1) and (2) that deal with annual data (fixed and random effect estimations) seem to differ somewhat from our previous findings. Remittances have a positive effect on economic growth when annual data is used, but the effect is significant only in the random effects estimation. The results using 5-year averages are also not consistent. The fixed-effects estimation (column [3]) suggests that remittances have no significant impact on growth, yet the random-effects estimation (column [4]) suggests otherwise. Given these mixed results, we explore the instrumental variable estimation further using the instrument recommended by Barajas et al. (2009).

Table A2: IV Estimation Results for Economic Growth: Traditional Instruments

Variable	(1)	(2)	(3)	(4)
Remittances	0.18	0.25	1.64	0.41
	(1.08)	(1.82)*	(1.55)	(1.71)*
Initial GDP	–	0.58	−2.04	0.07
		(2.05)**	(−1.32)	(0.18)
Investment	1.26	1.37	2.43	3.00
	(4.91)***	(5.49)***	(2.38)**	(3.98)***
Openness	−0.08	−0.30	−1.04	−0.39
	(−0.18)	(−1.15)	(−0.88)	(−1.03)
Inflation	0.01	0.01	0.00	0.02
	(0.75)	(0.75)	(−0.04)	(0.38)
Human Capital	0.01	0.01	0.02	0.00
	(1.41)	(1.28)	(0.69)	(−0.16)
Obs.	101	101	46	46
Countries	15	15	15	15
F / Wald Test	1303.27	39.67	88.07	23.10

GDP = gross domestic product.
Notes: The dependent variable is economic growth. (1) instrumental variable fixed- effects estimations with annual data, instruments: crop production index, livestock production index and political risk index. (2) instrumental variable random-effects estimations with annual data, instruments: crop production index, livestock-production index and political-risk index. (3) instrumental variable fixed-effects estimations with 5-year averages, instruments: crop production index, livestock-production index, and political-risk index. (4) instrumental variable random-effects estimations with 5-year averages, instruments: crop production index, livestock-production index, and political-risk index.
The numbers in parentheses are the t-statistics. *, **, *** indicate 10 %, 5 % and 1 % level of significance respectively.
Source: Authors' estimates.

As we suggested above, the tricky part in an instrumental variable estimation is to find a valid instrument. Barajas et al. (2009) recently proposed the use of the ratio of remittances to GDP of all the other countries in the sample as an instrument for remittances. This variable reflects the functioning of the global remittances system and can provide some indication of the reduction in the costs of remitting across time. Still, this is not a perfect instrument. It does not provide information about country-specific factors and it does not vary much from country to country. Nonetheless, the instrument certainly has merit and it is an improvement over previous instruments in the literature, so for robustness purposes, we include Table A3 in which we provide the results of the fixed-effects estimation when such instrumental variable is selected. In all cases, the impact of remittances on economic growth seems to be positive. However, in none of the cases is the impact significant. However, this is still more encouraging than the results reported in Barajas et al. (2009) for a larger set of countries, where the authors presented evidence in several estimations that remittances were actually curtailing economic growth.

Table A3: IV Estimation Results for Economic Growth: Barjas et al. (2009) Instrument

Variable	(1)	(2)	(3)	(4)
Remittances	0.43	0.45	4.60	3.54
	(1.35)	(1.61)	(0.18)	(0.24)
Initial GDP	–	0.19	−5.28	1.65
		(0.86)	(−0.2)	(0.21)
Investment	1.11	1.25	3.91	7.74
	(4.89)***	(5.62)***	(0.31)	(0.3)
Openness	0.43	0.29	1.57	−0.50
	(1.52)	(1.43)	(0.19)	(−0.19)
Inflation	0.00	0.00	0.00	0.00
	(0.66)	(0.89)	(−0.21)	(−0.03)
Human Capital	0.00	0.00	0.09	−0.01
	(−0.5)	(−0.13)	(0.27)	(−0.1)
Obs.	199	199	76	76
Countries	26	26	27	27
F / Wald Test	1867.46	36.07	11.07	0.93

GDP = gross domestic product.

Notes: The dependent variable is economic growth. (1) instrumental variable fixed-effects estimations with annual data. (2) instrumental variable random-effects estimations with annual data. (3) instrumental variable fixed-effects estimations with 5-year averages. (4) instrumental variable random-effects estimations with 5-year averages.

The numbers in parentheses are the t-statistics. *, **, *** indicate 10 %, 5 % and 1 % level of significance respectively.

Source: Authors' estimates.

Appendix B: Data

The data are in annual frequency for 1988–2007. Remittances, investment, and openness are included as shares of gross domestic product (GDP) and in natural logs in the estimation.

Variable	Source	Definition
Remittances	World Bank Migration and Remittances Factbook	Remittances are defined as the sum of workers' remittances, compensation of employees, and migrants' transfers from the balance of payments.
Economic Growth	World Development Indicators	This is the annual per capita GDP growth (percent). In several of the estimations, 5-year averages are used.
Investment	World Development Indicators	Investment is defined as gross capital formation. This is the new investment in fixed capital assets in a country for a given year.
Openness	World Development Indicators	This is exports plus imports as share of GDP (percent).
Inflation	World Development Indicators	This is the percentage change in the GDP deflator.
Human Capital	World Development Indicators	Primary completion rate, total (percent of relevant age group).
Poverty Headcount Ratio: National Poverty Line	World Development Indicators	Share of the population in a certain country whose income is below a national poverty line.
Poverty Gap: US$1.25 a Day.	World Development Indicators	Mean shortfall of the total population from the poverty line, expressed as a percentage of the poverty line.
Poverty Headcount Ratio: US$1.25 a Day.	World Development Indicators	Share of the population in a certain country whose income is below US$1.25.
Crop Production Index	World Development Indicators	Agricultural production for each year relative to the base period. It includes all crops except fodder crops.
Live Stock Production Index	World Development Indicators	Livestock production index includes meat and milk from all sources, dairy products such as cheese, and eggs, honey, raw silk, wool, and hides and skins.
Government Stability Index	Political Risk Services Group	See www.prsgroup.com/ for further details.

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About the Paper

Carlos Varga-Silva, Shikha Jha, and Guntur Sugiyarto examine the potential role of remittances for promoting economic growth and reducing poverty in Asia using data for more than 20 countries in the region for 1988–2007. The key results indicate that remittances positively affect the growth of home country real gross domestic product per capita, but only have a negligible effect on the overall poverty rate. The remittances, however, tend to reduce the poverty gap and thereby ameliorate the depth of poverty. The robustness of the key results is assessed using 5-year average data, while the potential endogeneity issues in the estimation are addressed through the use of instrumental variables.

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